oxygen say two or three times as large as the capacity of the tubing itself. But under certain circumstances this is found to be by no means sufficient, as the following experiment illustrates.

Ten feet of thin-walled gray tubing having an internal diameter of one fourth of an inch, was used on a burner for half an hour, and was from there transferred immediately to a gasometer of oxygen; the gas was then allowed to pass through the tubing and fill over water a cylinder the capacity of which was 560 cc.

As might have been expected the gas so obtained in the cylinder exploded violently. The volume of such a piece of tubing is about 95 cc., and hence the gas drawn off would contain something less than one sixth of the mixed hydrocarbons.

A second cylinder was then drawn off, and when a taper was thrust into it an explosion was produced which was as violent as the first.

The third cylinder also exploded, though less violently; the fourth flashed back slowly to the bottom, and the fifth behaved like pure oxygen.

Thus in this case 2,240 cc. were used to wash out a tube whose volume was less than 100 cc. That is, the contents of the tubing were displaced more than twenty times before the gas was removed.

The experiment obviously points to a solubility of the gas in rubber, and this is not surprising in view of the ready absorption by rubber of the low-boiling paraffin hydrocarbons in the liquid state.

That a certain amount of gasoline is absorbed in rubber may also be shown by passing a piece of rubber tubing up into a tube filled with the gas and inverted over mercury. It is of course to be remembered that the gas supplied by such machines as that in use here (Springfield Gas Machine) consists of a mixture of the vapors of the hydrocarbons with a very considerable proportion of air, so that such absorption experiments as these can only be relative. An evident absorption takes place even with gasoline which does not show any abnormal behavior when conducted through the tubing; but when such behavior was manifested, the absorption was more than doubled.

The danger arising from this source lasts for only a short time after the gasoline tank has been filled; and indeed the results recorded above were obtained only twice, although four attempts were made immediately after the filling of the tank; this irregularity is probably due to the varying demands made upon the gasoline machine at different times.

The rubber tubing employed in the experiments was such as is furnished under the catalogue number 8012 by Messrs. Eimer and Amend. The gasoline was that supplied by the Gilbert and Barker Manufacturing Company; hence it is of normal quality; the phenomenon in question was observed both with the 86° and 90° products (degrees Baumé, equivalent to the specific gravities 0.66 and 0.65).

On the whole these observations point to the conclusion that gasoline of the kind described contains a small amount of more volatile components, which are given off mainly at first, and being perhaps more soluble in rubber than those which come over later, cause the abnormal behavior above described.

It would be interesting to know whether others who use gasoline have had occasion to notice this peculiarity.

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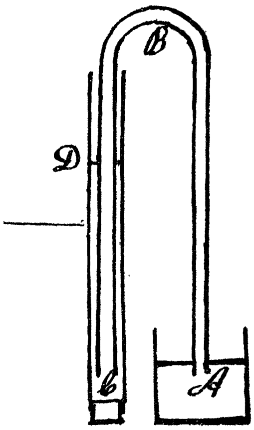
ON THE SIPHON.

THE writer wishes to call attention to an error that has crept into the text-books on general physics, written for high school and university classes. Most of the books either state explicitly that a siphon will not work if the shorter of its two legs is longer than the column of liquid that would be supported by the air pressure, or else give explanations of the siphon, from which this follows as a legitimate conclusion. As a matter of fact, a siphon can be made to work and draw the liquid to a height considerably greater than that representing atmospheric pressure.

The writer usually illustrates this fact in his lectures by means of the following simple experiment: Let ABC in the figure be a glass

siphon tube, both legs of which are 10 cm. or 15 cm. longer than the barometric column. The bore of the tube should be small (about $\frac{1}{10}$ sq. mm.) to work well. Let one of the legs, *BC*, dip down into a larger tube *CD*, partly filled to *D* with mercury. Fill *ABC* with mercury, and start the siphon drawing mercury from *C* over to *A* in the usual way. In order to start the siphon the vertical height of *B* above the surface *D* of the mercury should be less than the length of a mercury barometer column, but as the flow continues, the mercury surface descends and keeps on descending until its vertical distance below *C* is considerably greater than this length.



To make this experiment work sufficiently well for demonstration purposes, excessive care in purifying the mercury and cleaning the glass is not necessary. Boiling the mercury in the actual tubes used, for instance, is superfluous. With ordinary redistilled commercial mercury and tubes cleaned with alcohol the writer has made the siphon work to a height of 70 cm. As the altitude of the University laboratory, where the experiment was performed, is a little over one mile, and the barometer pressure, therefore, only about 61 cm., this means that the siphon worked 9 cm. above the barometric height.

The most plausible explanation of the above fact is that the atmospheric pressure is not the only force pushing the mercury up the shorter leg. It is drawn up partly by the cohesive attraction of parts of the mercury for each other, and the column is kept from dwindling by the adhesive force exerted by the sides of the tube on the mercury.

It follows from the above that if a mercury siphon is placed under the receiver of an air pump, it can be made to work over a height of several centimeters, even though the air pressure is reduced to only a few millimeters. This experiment also has been shown to the writer's students. The apparatus was similar to that described above, except that the tubes were much shorter.

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FOSSIL SHELLS OF THE JOHN DAY REGION.

SINCE the publication about a year ago* of my paper on the 'Fossil Land Shells of the John Day Region,' etc., I have received from Professor John C. Merriam, of the University of California, a small collection of molluscan remains obtained by him in the same general locality. Professor Merriam's collection includes examples of the several species of land shells heretofore described,† namely, *Epiphragmophora fidelis anticedens, Polygyra Dalli, Ammonitella Yatesi præcursor* and *Pyramidula perspectiva simillima.* Of these four species there are numerous specimens and fragments. Dr. White's *Unio Condoni* apparently escaped detection. The foregoing represent all of the molluscan forms thus far reported from the John Day beds. Dr. White received his material from the late Professor E. D. Cope and Professor Thomas Condon, of the University of Oregon. Cope's specimens were obtained by Mr. Jacob L. Wortman, of the Army Medical Museum. These two collections included the same species.

Professor Merriam has made some interesting additions to the above brief list which are described below.

HELIX (EPIPHRAGMOPHORA?) DUBIOSA NOM. PROV.

Shell orbicular, flattened, discoidal, periphery angulated or obtusely carinated; whorls

* *Proc. Washington Acad. Science*, Vol. II., Dec. 28, 1900, pp. 651–658, pl. XXXV.

† Vide Dr. Charles A. White's paper 'On Marine Eocene, Fresh Water Miocene and other Fossil Mollusca of Western North America'; Bulletin No. 18, U. S. Geol. Survey, Washington, 1885, with two plates.